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AGRICULTURAL RESEARCH
FOR DEVELOPMENT

Coconut research at CIRAD

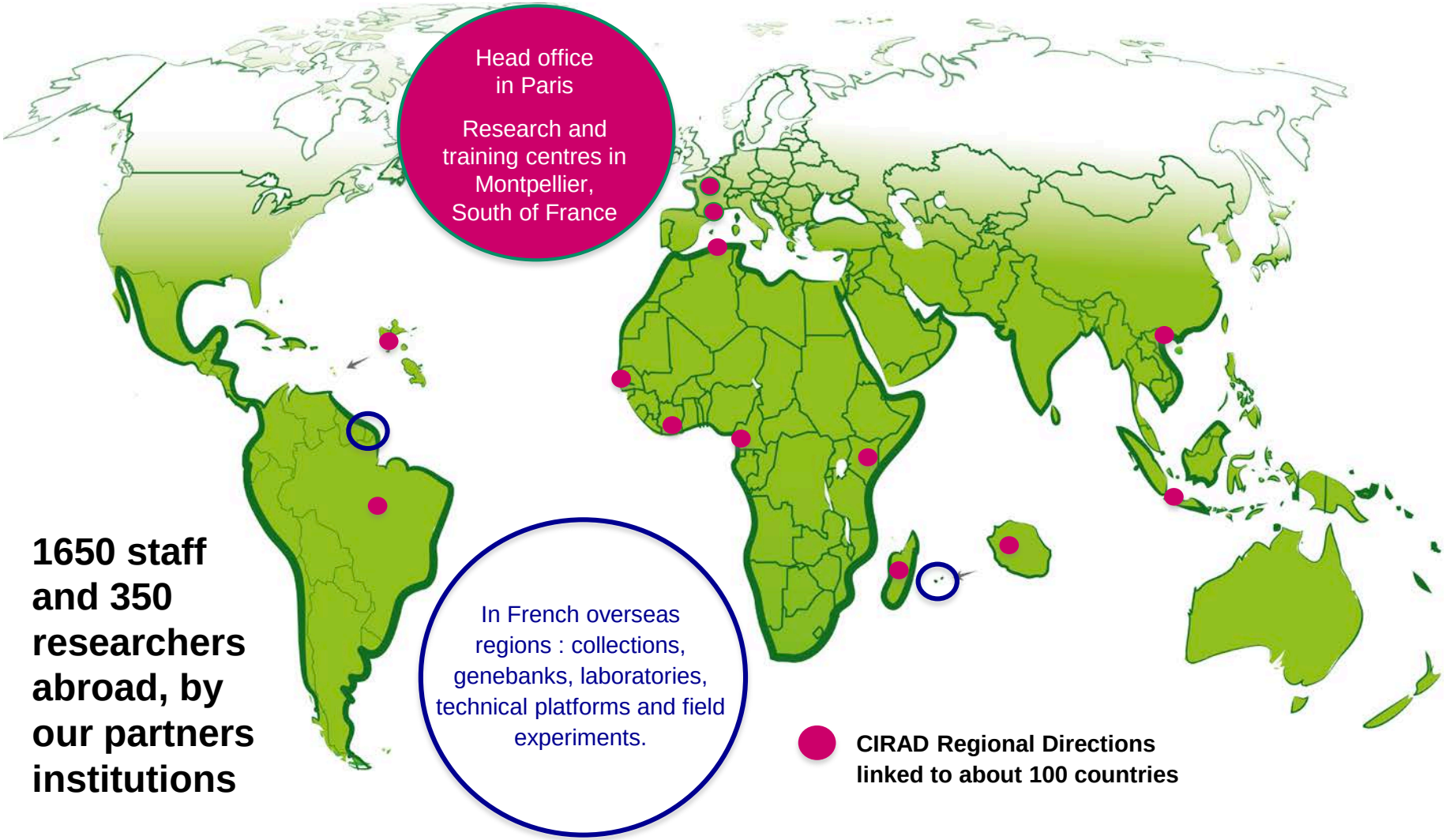
Dr. Alexia Prades

Coconut sector focal point

www.cirad.fr

55th ICC Ministerial Session, 25- 30 August 2019, Manila, Philippines

CIRAD - French Agricultural Research and International Cooperation Organization working for the sustainable development of Tropical and Mediterranean regions



1650 staff and 350 researchers abroad, by our partners institutions

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Three scientific departments

UNDERSTANDING
biological systems, from molecule to ecosystem

Biological Systems Department (BIOS)

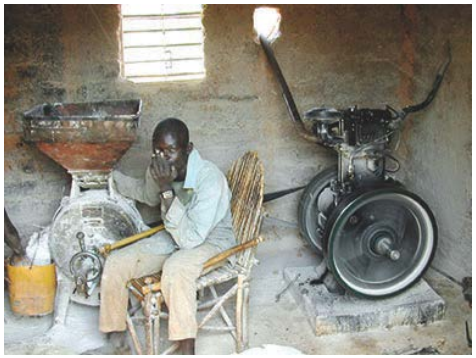
11 research units

ANALYSING
the practices and performance of farming systems, from plot to farm

Tropical Production and Processing Systems Department (PERSYST)

12 research units

SUPPORTING
players in rural areas, from a local to a global level



Environment and Societies Department (ES)

10 research units

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A basic working principle: research in partnership

- Working together to establish and implement priorities
- Working in the South, where our partners are, in their laboratories or in their fields

Training the talents of the future

800 researchers and technicians received and trained each year

300 PhD students (60% from developing and emerging countries)

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CIRAD and the coconut sector

- **More than 70 years of experience on coconut fruit production and processing in the world**
- **A pool of 15 researchers**
  - Breeding, genomic, bioinformatic (4)
  - Agronomy and GIS (4)
  - Phytopathology and entomology (2)
  - Coconut fruit processing and products quality (4)
  - Market and value chain analysis (1)

Sustainability of coconut sector in the future

1. **Replant** and replace old trees with proper planting material
2. Preserve the **biodiversity** in genebanks (to address new market trends, climate change…)
3. Decrease the **biotic pressure** (LYDs and insects) and increase **productivity** in the field (fertilizers, inter-cropping…)
4. Improve the **quality** of copra (efficient and safe dryers, controlled conditions and duration of storage) – (sanitary issue)
5. Encourage **diversification** of products and participatory certification systems. This will increase farmers' and processors' revenues and create jobs in rural areas.

CIRAD activities to support this strategy in partnership

Signature of MoU between CIRAD and ICC

in Jakarta, Indonesia

duration 5 years from 2019 to 2023

Topics

- **Conservation**, breeding and selection: genomic studies, characterization of the biodiversity
- **Agronomy**: primary production from nursery stages until harvesting
- **Phytopathology** and **Entomology** (focus on LYD)
- **Processing** : domestic to semi-industrial scales, focus on re-engineering of traditional process
- **Quality** and **standards** for coconut products
- Development of **communication** and information (documents, database, etc.)
- **Training** of scientific officers

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INTERNATIONAL COCONUT COMMUNITY 1969

Signature of MoU between CIRAD and ICC

in Jakarta, Indonesia

duration 5 years from 2019 to 2023

Three forms of cooperation

- Project for **technical assistance**
- Project for **research**
- Other **specific projects** :
  - Training of research and technical staff
  - Hosting of research and technical staff
  - Organization of seminars, meetings…

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INTERNATIONAL COCONUT COMMUNITY 1969

Seed supply for replanting in the Pacific

Dr. Roland Bourdeix Dr. Jean-Pierre Labouisse

The CIDP Project Purpose is to improve the competitiveness of small producers engaged in the coconut value chains, through a strengthened regional integration of related markets and the **intensification of Coconut production.**

http://replantcoconut.blogspot.com/

Pacific Community
Communauté du Pacifique

European Union

CIDP
COCONUT INDUSTRY DEVELOPMENT FOR THE PACIFIC

Source R. Bourdeix et al., APCC Conf., 2018

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Genomic : Coconut Genome Sequencing

Dr. Luc Baudouin

Dr. Stéphanie Sidibe-Bosc

Mapping population in the nursery

(CNRA, CIRAD, COGENT)

2012 – 2016

© Dr Issali, CNRA, May 2015

Leaf samples sent to CIRAD for analyses
Sept.2015 through SMTA

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CNRA

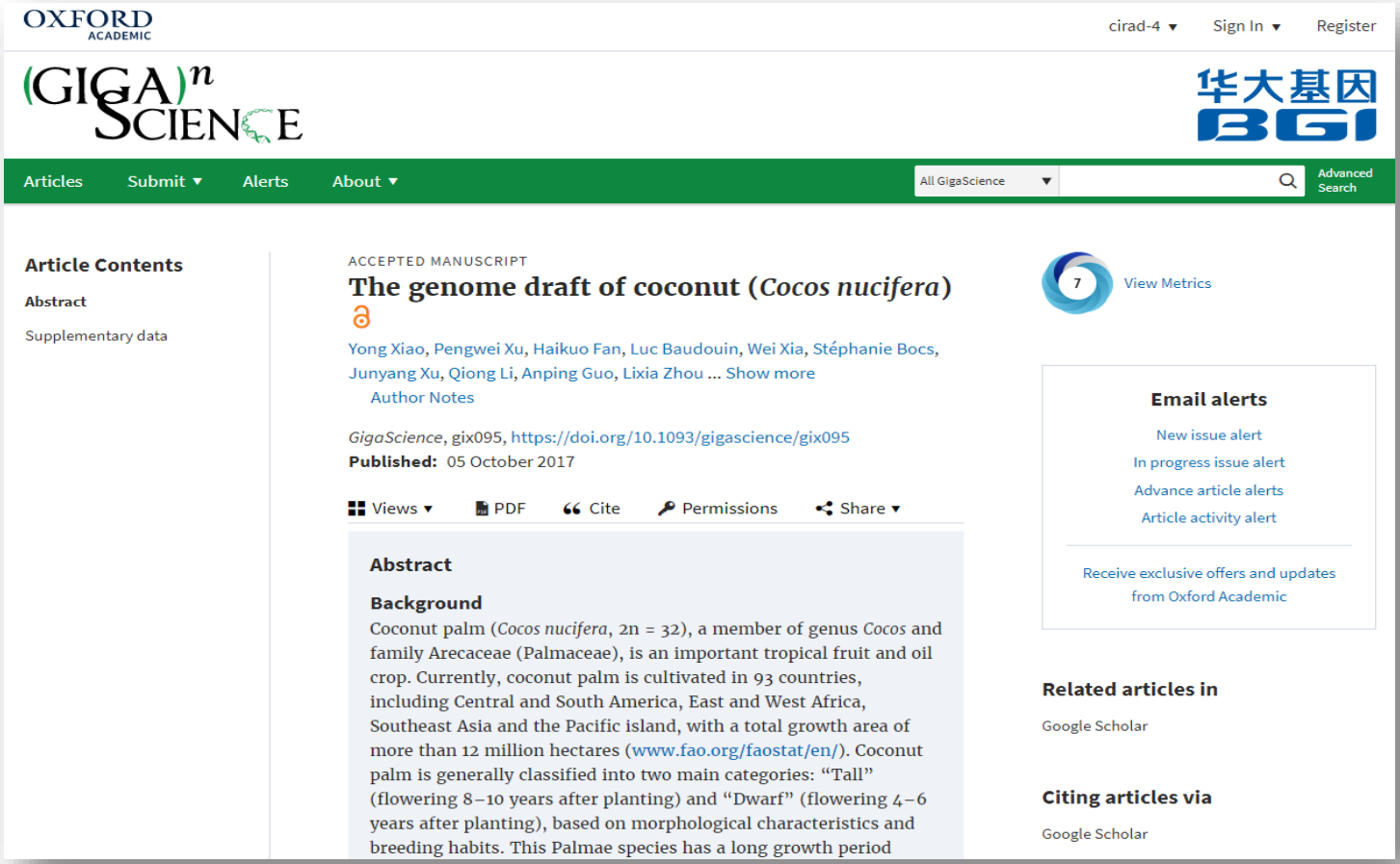
CATAS 1954

华大基因 BGI

Coconut Genome sequencing

First publication of the sequence of the coconut genome by CATAS, BGI, CIRAD, CNRA

Xiao, Y., Xu P., et al. (2017). "The genome draft of coconut (Cocos nucifera)." GigaScience: gix095-gix095.



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Preserving biodiversity

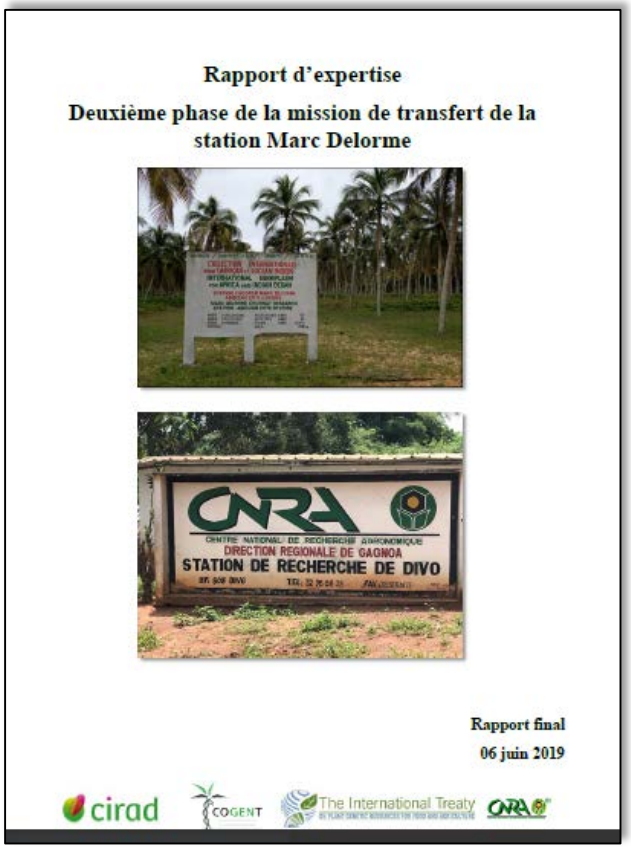
Consultancy for the Government of Ivory Coast to prepare the transfer of the International Coconut Genebank for Africa and Indian Ocean in collaboration with CNRA, COGENT and TIRPAA/FAO

Dr. Thierry Leroy

Dr. Luc Baudouin

Dr. Roland Bourdeix

Dr. Fabian Pilet



COGENT

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Preserving biodiversity against lethal yellowing in Indian Ocean

Dr. Fabian Pilet

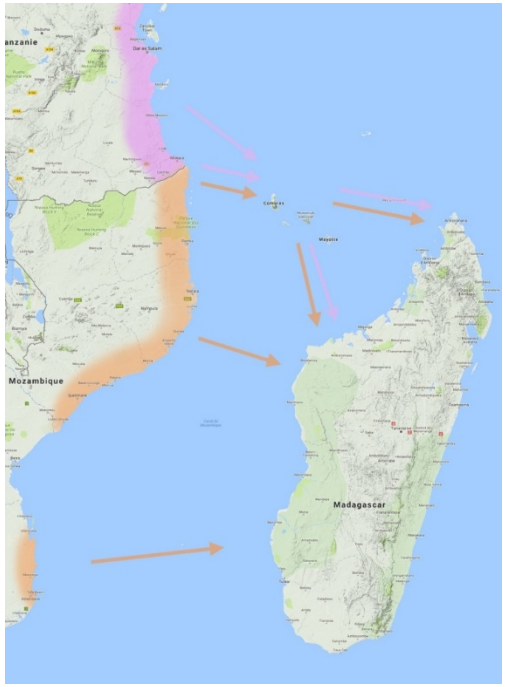
EPIBIO PROJECT
REGIONAL EPIDEMIOSURVEY
AND LETHAL YELLOWING IDENTIFICATION

EpiBio-OI

-Two types of phytoplasma in East Africa

- Risks of contamination for Madagascar, Comoro Islands, etc.

- Regular prospection missions, sampling and biomolecular analyses



UNION EUROPEENNE

l'Europe s'engage à La Réunion avec le FEDER

REGION REUNION
www.regionreunion.com

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Source F. Pilet, Coconut internal workshop, CIRAD, Sept.2018

Preserving biodiversity against lethal yellowing

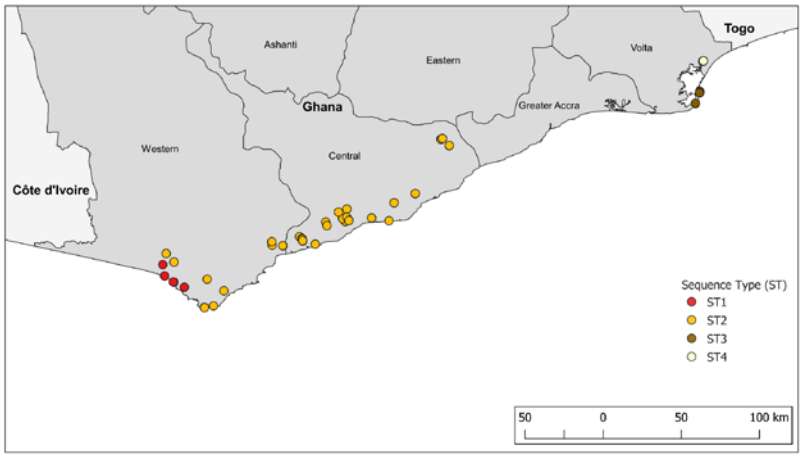
EUROPEAN H2020 PROJECT TROPICSAFE

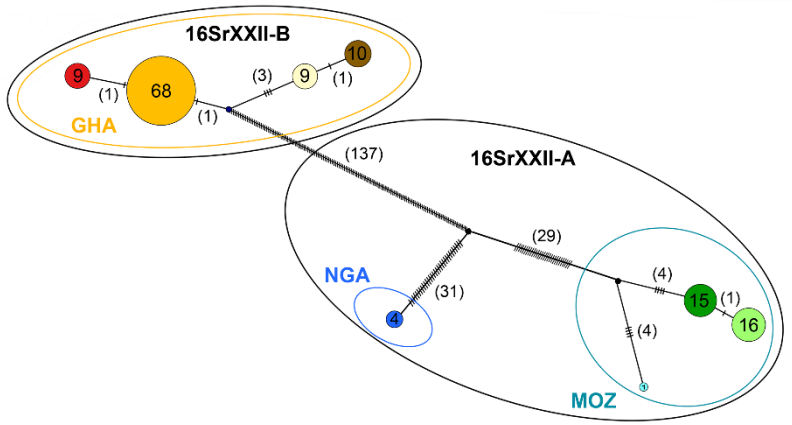
Insect-borne prokaryote-associated diseases in tropical and subtropical perennial crops

- Coordination : A. Bertaccini (University of Bologna, Italy)
- Three biological models : vines, citrus, and coconut

Dr. Fabian Pilet

Dr. Luc Baudouin





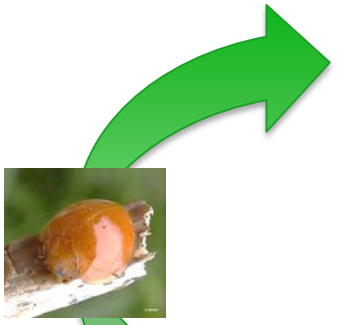
Source : Pilet et al., 2019. Appl Environ Microbiol 85:e02716-18.

Control of biotic stress

Full success confirmed in Timor Leste

Dr Laurence Ollivier Dr Xavier Bonneau

Introduction of a biological agent (***Chilocorus politus*, Coleoptera, Coccinellidae**) to control the pest *Aspidiotus destructor* (Hemiptera, Coccoidea, Diaspididae)



December 2018

December 2003

Diversification

Value chain analysis of the coconut sector in Côte d'Ivoire – ongoing

Coordination and Technical team

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(CIRAD, Montpellier)

Eng. Victoria Bancal
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(Master student,
Univ. Nangui Abrogoua)

Agro-economical team

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(CIRAD, Montpellier)

Dr. Jean-Jacques Iritié Bi Goli
(INP-HB)

Fulgence Soumonni
(Master Student, INP-HB)

Products from Côte d'Ivoire

Traditional

© A. Prades, Cirad

New

© V.Bancal, Cirad

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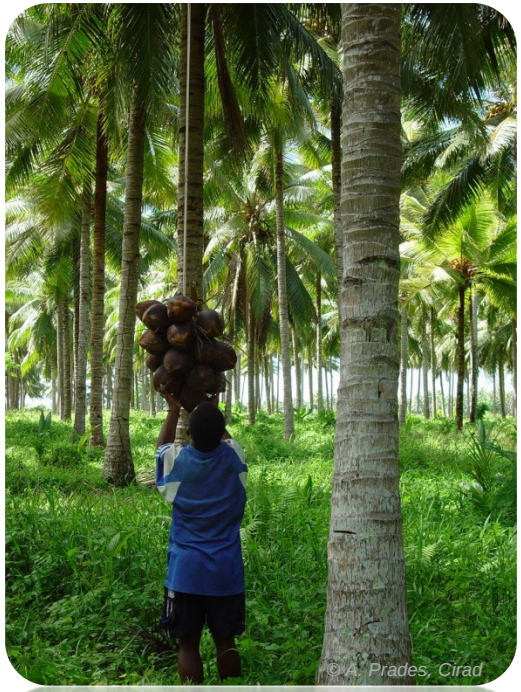
Thank you for your attention



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